

# Toxic Selenium:

## HOW MOUNTAINTOP REMOVAL COAL MINING THREATENS PEOPLE & STREAMS

“PEOPLE ARE NOT EATING THE FISH ANYMORE—they’re really concerned about their health. They don’t get these federal reports, and we don’t even have cell coverage, let alone computer coverage. They’re not as knowledgeable on all these consumption alerts.

The consumption warning for the Mud River Reservoir was put into effect in the summer of 2008. People are concerned—they’ve already consumed so much fish from there.”

– Versie Sims,  
resident near Mud River Reservoir, West Virginia

**WHAT IS SELENIUM?** Selenium is a mineral that, while in small amounts is necessary to support life (it is present in many vitamin pills), in larger amounts can be extremely toxic to people and to wildlife.

**WHERE DOES IT COME FROM?** One of the leading sources of selenium contamination is coal mining and ash from coal-fired power plants. When coal mining disturbs layers of earth containing high levels of selenium, runoff can carry this toxin to surface water or cause it to leach into ground water. Once coal is burned, selenium is concentrated in the remaining ash. Ash disposal sites can also release toxic levels of selenium.

### WHAT ARE ITS HEALTH EFFECTS?

**HUMANS:** Selenium can be extremely toxic to people. In the short term, exposure can cause hair and fingernail loss, fatigue, and irritability. In the long term, selenium exposure can cause damage to the liver, the kidneys, and to the nervous and circulatory systems. People are exposed to toxic levels of selenium by eating contaminated fish or drinking water that exceeds Safe Drinking Water Act threshold levels of 0.05 parts per million.

**WILDLIFE:** Since selenium builds up in living organisms over time, even a small amount in water can increase exponentially in fish and wildlife. Fish and birds are poisoned by eating selenium-laden food, including contaminated insects, fish or vegetation. In addition, selenium can cause reproductive problems as it’s passed from parents to offspring in eggs. In fish, ingestion of toxic amounts of selenium can cause total reproductive failure, birth defects and damage to gills and internal organs.



Dorsal view of abnormal fish larva from Upper Mud River Reservoir, June 2007. Note deformed spine in “S” shape, typical of scoliosis due to selenium poisoning.



A mountaintop removal coal mining site in West Virginia.

**WHERE HAS SELENIUM BEEN FOUND?** Since federal studies in 2002 first documented high levels of selenium downstream from some mountaintop removal coal mines in West Virginia, numerous selenium toxic hot spots have been identified in central Appalachia.

**THERE IS, HOWEVER, A SYSTEMIC AND TROUBLING TREND:** State and federal agencies have allowed coal mines and power plants to release dangerous amounts of selenium essentially unabated and without penalty.

**WEST VIRGINIA – OHIO RIVER:** Selenium has been found downstream of the fly ash disposal dam for Ohio Power's Mitchell Power Plant along the Ohio River. Conner Run, just downstream from the dam, is on the state's impaired stream list due to high selenium levels found in the water. The dam is also near the largest blue heron nesting area in the state, which is part of the Ohio River Islands National Wildlife Refuge.

**TENNESSEE - ZEB MOUNTAIN:** During the summer of 2008, the Zeb Mountain coal mine in Tennessee was discovered releasing selenium. Water samples from the state Department of Environment and Conservation showed that the mine released more than nine times the allowed amount of selenium. Studies have shown that concentrations of double the allowed amount cause complete aquatic life reproductive failure in reservoirs and significant reproductive reduction in streams. Indeed, the coal company's own sample revealed that selenium was being discharged from one location at 20 times the allowed amount.

**WEST VIRGINIA – MUD RIVER RESERVOIR:** The Hobet 21 mining complex located on the Mud River is the largest mining complex in West Virginia and a known selenium hotspot. The Mud River is on the state's impaired stream list due to selenium contamination. Just downstream from the mine, researchers have found alarming concentrations of selenium and related deformities in fish from the Mud River Reservoir, which triggered an "unsafe to eat" fish advisory for local anglers. However, as the result of a lawsuit brought by local environmental groups, Hobet must now take measures to substantially reduce toxic selenium discharges from the mine.

## WHAT CAN I DO TO HELP STOP SELENIUM POLLUTION?

- Help stop the devastating practice of mountaintop removal coal mining: <http://www.sierraclub.org/mtr>
- Get involved with the Sierra Sportsmen Network on angler issues: <http://www.sierrasportsmen.org/>
- Get involved with the Sierra Club's partner organizations on this issue: Save Our Cumberland Mountains and the Appalachian Center for the Economy and the Environment.
- If you have a well and want to test it, contact a local lab for details on buying a test kit, or take a sample of the water to them for testing.
- Tell state and federal agencies to require pre-mining selenium assessments and to enforce the Clean Water Act and Surface Mining Control and Reclamation Act.
- Write a letter about the coal industry and selenium to the editor of your local newspaper.



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